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JC815 U.S. PTO 05/19/00

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	I-2-136.1US
First Inventor or Application Identifier	Dick et al.
Title	UPLINK SCRAMBLING CODE ASSIGNMENT FOR A RANDOM ACCESS CHANNEL
Express Mail Label No.	EL566348695US

JC571 U.S. PRO 09/574091 05/19/00

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. [X] * Fee Transmittal Form *(e.g., PTO/SB/17)* *(Submit an original and a duplicate for fee processing)*
2. [X] Specification [Total Pages 16] *(preferred arrangement set forth below)*
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 15]
4. Oath or Declaration [Total Pages 3]
   a. [ ] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d)) *(for continuation/divisional with Box 16 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. [ ] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. [X] Other: Communication Under Rule 37 C.F.R. 1.53(b) Certificate of Mailing by Express Mail

16. **If a CONTINUING APPLICATION,** *check appropriate box, and supply the requisite information below and in a preliminary amendment:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: _____

Prior application information: Examiner _____ *Group / Art Unit:* _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

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Signature	Jeffrey M. Glabicki	Date	5/19/00

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Express Mail Label No. EL566348695US
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Dick et al.
Application No.:	Not Yet Known
Filed:	Not Yet Known
For:	UPLINK SCRAMBLING CODE ASSIGNMENT FOR A RANDOM ACCESS CHANNEL
Group:	Not Yet Known
Examiner:	Not Yet Known

Our File: I-2-136.1US
Date: May 19, 2000

CERTIFICATE OF MAILING BY EXPRESS MAIL ACCOMPANYING PATENT APPLICATION

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I hereby certify that the accompanying correspondence is being deposited with the "Express Mail Post Office to Addressee" service of the United States Postal Service in an envelope addressed to Box PATENT APPLICATION, Assistant Commissioner for Patents, Washington, D.C. 20231 on May 19, 2000. The number of the "Express Mail" mailing label EL566348695US has been placed on the accompanying correspondence prior to mailing. It is therefore respectfully requested that this correspondence be considered as having been filed in the Office on the date shown above in accordance with the provisions of 37 C.F.R. § 1.10.

Respectfully submitted,

5/19/00
Date

Kecia Rahming

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Express Mail Label No. EL566348695US

Attorney Docket No. I-2-136.1US

UPLINK SCRAMBLING CODE ASSIGNMENT FOR A RANDOM ACCESS CHANNEL

This application claims priority from U.S. Provisional Application No. 60/134,880, filed May 19, 1999.

BACKGROUND

The invention relates generally to resource allocation in a wireless code division multiple access (CDMA) communication system. More specifically, the invention relates to assigning uplink scrambling codes in a CDMA communication system.

Figure 1 depicts a wireless spread spectrum Code Division Multiple Access (CDMA) communication system **20**. A base station **22** communicates with user equipment (UE) $\mathbf{24_1}$-$\mathbf{24_n}$ in its operating area. In a spread spectrum CDMA system **20**, data signals are communicated between UEs $\mathbf{24_1}$-$\mathbf{24_n}$ and the base station **22** over the same spectrum. Each data signal in the shared spectrum is spread with a unique chip code sequence. Upon reception, using a replica of the original chip code sequence, a particular data signal is recovered.

Since signals are distinguished by their chip code sequences (code), separate dedicated communication channels are created using different codes. Signals from the base station **22** to the UEs $\mathbf{24_1}$-$\mathbf{24_n}$ are sent on downlink channels and signals from the UEs $\mathbf{24_1}$-$\mathbf{24_n}$ to the base station **22** are sent on uplink channels. For coherent detection of downlink

transmissions by the UEs 24_1-24_n, pilot signals are transmitted to all of the UEs 24_1-24_n within the base station's operating range. The UEs 24_1-24_n condition their receivers based on the pilot signals to enable data reception.

In many CDMA systems, a random access channel, such as the common packet channel (CPCH), is used for some uplink transmissions. A CPCH is capable of carrying packets of data from different UEs 24_1-24_n. Each packet is distinguishable by its code. For detection by the base station **22**, the packets have a preamble which also distinguishes it from other packets. The CPCH is typically used to carry infrequently communicated data at high rates.

Figure 2 illustrates a CPCH time slot and frame structure. The CPCH structure is time divided into radio frames 30_1-30_m having time slots 28_1-28_n, such as eight time slots proposed for the Third Generation Mobile Telecommunications System (IMT-2000)-UMTS. A radio frame 30_1-30_m in IMT-2000 is 10 milliseconds in duration and each time slot is 1.25 ms. The radio frames 30_1-30_m are grouped into superframes **32**. Each superframe **32** has a fixed number of radio frames 30_1-30_m, such as 72 radio frames in IMT-2000.

To allow more than one UE 24_1-24_n to use a given time slot 28_1-28_n, multiple signatures are used to distinguish the UEs 24_1-24_n. In IMT-2000, sixteen different signatures are used. A particular signature used within a particular time slot is referred to as an access opportunity. **Figure 3** illustrates the access opportunities 26_{11}-26_{mn} of the CPCH. For instance, as proposed for IMT-2000, for each of the 8 time slots, one out of 16

signatures is available to be chosen, resulting in 128 access opportunities. Each access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ is preassigned an uplink scrambling code. The scrambling code is a function of the time slot T_K and the signature S_K that the UE used for access. Accordingly, the uplink scrambling code, C_K, is a function of the time slot, T_K, and signature, S_K, of the access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ as in **Equation 1**.

$$C_K = 8 * T_K + S_K \qquad \textbf{Equation 1}$$

The UE $\mathbf{24_1}$ transmits a data packet using a selected access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$. Upon identifying a particular access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$, the base station **20** sends out an acknowledgment message (ACK) if the corresponding scrambling code is available. The ACK message may be one of several types, such as simply being a downlink transmission of the signature associated with the UE's access attempt. If the scrambling code is not available, a negative acknowledgment (NAK) is sent. After receiving the appropriate ACK message, the UE $\mathbf{24_1}$ selects the proper uplink scrambling code to transmit the packet data on the CPCH. If the UE $\mathbf{24_1}$ receives a NAK, it will re-attempt access by transmitting another packet.

This approach for assigning uplink scrambling codes has drawbacks. A typical scrambling code is only 10 ms in length. A transmitted data packet may last more than one radio frame **30**. Since a data packet may last for multiple radio frames, the scrambling code used for that packet can only be reassigned after the transmission of that packet is complete.

As a result, the number of CPCH users is limited by the number of scrambling codes assigned to the access opportunities $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$, such as 128 scrambling codes. Additionally, if a second user uses the same access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ as an already transmitting first user, the second user will receive a NAK. Repeated negative access attempts lower the efficiency of the system **20** which is undesirable.

Accordingly, it is desirable to use alternate scrambling code assignment schemes.

SUMMARY

A user equipment transmits a data packet using a selected signature in a time slot of a radio frame within a superframe of a common packet channel. The superframe being time divided into radio frames. A base station identifies the selected signature, transmission time slot and transmission radio frame of the data packet. The base station determines an uplink scrambling code for the user equipment based on in part the identified signature, transmission time slot and transmission radio frame. The base station selectively transmits an acknowledgment message based on in part an availability of the determined uplink scrambling code. The user equipment receives the acknowledgment message and transmits a subsequent data packet using the determined uplink scrambling code.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an illustration of a typical wireless spread spectrum CDMA

communication system.

Figure 2 is an illustration of the time slots, radio frames and superframes of the random access channel.

Figure 3 is an illustration of a random access channel access scheme.

Figure 4 is a flow chart of uplink scrambling code assignment.

Figure 5 is a simplified base station and user equipment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 4 is a flow chart of uplink scrambling code assignment. To initiate communications with the base station **22**, a UE $\mathbf{24_1}$ transmits a data packet over the random access channel, such as a CPCH. The packet is transmitted with a selected access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$. The selected access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ is defined by its signature and time slot in a radio frame $\mathbf{30_1}$-$\mathbf{30_m}$. The UE $\mathbf{24_1}$ also knows which radio frame $\mathbf{30_1}$-$\mathbf{30_m}$ within the superframe and access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ the packet was transmitted, **34**. For instance, in a system $\mathbf{30_1}$-$\mathbf{30_m}$ having a superframe **32** of seventy-two radio frames $\mathbf{30_1}$-$\mathbf{30_m}$, an access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ using code 2 in time slot 4 sent in the twentieth radio frame in the superframe sequence is known by the UE $\mathbf{24_1}$.

The base station **22** identifies the access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ and the radio frame **30** within the superframe **22** in which the packet was transmitted, **36**. The uplink scrambling codes are assigned based on a function of the selected access opportunity $\mathbf{26_{11}}$-$\mathbf{26_{mn}}$ and

radio frame 30_1-30_m used by the UE 24_1 for the packet as in **Equation 2**, **38**.

$$C_K = g\,(F_K, T_K, S_K) \qquad \textbf{Equation 2}$$

F_K is the transmitted packet's radio frame 30_1-30_m within the superframe **32**. Using **Equation 2**, the number of uplink scrambling codes that may be assigned is dramatically increased. For a system using eight time slots, sixteen signatures and seventy-two radio frames within the superframe **32**, the possible uplink scrambling code assignments increases from a maximum of 128 to 9,216. By increasing the available scrambling codes, the number of users capable of utilizing the CPCH is increased. Although increasing the number of available scrambling codes is desirable, it has drawbacks. The codes available to the system **20** is a limited resource and should be allocated conservatively.

One approach to limit the available scrambling codes with no or a negligible decrease in the number of users is to reassign codes after a number of radio frames 30_1-30_m. Some packets may last more than a single radio frame. However, the packet length typically does not exceed a certain number of radio frames 30_1-30_m. Additionally, based on the system **20**, the packet length may also be limited as a system parameter. A typical limitation for an IMT-2000 system would be eight radio frames. Since the packet duration is limited or the duration typically does not exceed a limit, the uplink scrambling codes may be repeated after a specified number of radio frames, the limit, L. The limit, L, may be a system design parameter. The limit, L, may also be broadcast or transmitted to the UEs 24_1-24_n at call setup or on a periodic basis.

For a system using a radio frame limit of L, **Equation 3** is a function for such an uplink scrambling code assignment.

$$C_K = g((F_K)_L, T_K, S_K) \qquad \textbf{Equation 3}$$

$(.)_L$ denotes a modulus-L operation. As a result, the uplink scrambling code assignments are repeated every L radio frames. Since no packets or a negligible number of packets exceed the frame limit, L, the number of users using the CPCH is not reduced.

For a system using an eight radio frame limit (L = 8), **Equation 3** becomes **Equation 4**.

$$C_K = g((F_K)_8, T_K, S_K) \qquad \textbf{Equation 4}$$

Using **Equation 4** in a 16 signature, 8 time slot system, the maximum number of assignable uplink scrambling codes is reduced to 1,024. Using **Equations 3** or **4** and the limit, L, the number of necessary uplink scrambling codes is kept to a low level with the number of potential users being increased dramatically.

Using either **Equation 3** or **4**, the base station **22** determines whether the scrambling code associated with the UE's access attempt is available, **40**. If that uplink scrambling code is not available, a NAK message is sent to the UE $\mathbf{24_1}$, **42**. After receiving a NAK message, the UE $\mathbf{24_1}$ will reattempt access, **44**.

If the determined uplink scrambling code is available, the base station **22** transmits

an ACK message to the UE 24_1, **46**. Subsequently, the UE 24_1 will transmit packet data using the uplink scrambling code associated with the UE's access attempt.

Figure 5 illustrates a simplified base station **22** and a UE 24_1 for use in implementing uplink scrambling code assignment. The UE 24_1 has a controller **60** for determining the scrambling code of the uplink data packets. A UE transmitter **58** sends uplink data packets to the base station **22** based on the determined scrambling code. A UE receiver **56** receives communications from the base station **22**.

The base station **22** has a controller **50** for determining the scrambling code of the uplink data packets. A base station transmitter **52** sends communications to the UE 24_1. The base station receiver **54** receives uplink data packets from the UE 24_1 using the determined scrambling code.

* * *

CLAIMS

What is claimed is:

1. A method of assigning uplink scrambling codes for use by a user equipment in transmitting packet data over a random access channel in a code division multiple access system, the random access channel being time divided into super frames having a set of radio frames, each radio frame is time divided into a set of time slots, the method comprising:

transmitting from the user equipment an access data packet using a selected signature out of a set of signatures and in a time slot of a radio frame;

identifying at a base station the selected signature, the transmission time slot and the transmission radio frame of the access data packet;

determining at the base station an uplink scrambling code for the user equipment based on in part the identified signature, transmission time slot and transmission radio frame;

selectively transmitting from the base station an acknowledgment message based on in part an availability of the determined uplink scrambling code; and

receiving the acknowledgment message at the user equipment and transmitting a subsequent data packet using the determined uplink scrambling code.

2. The method of claim 1 further comprising if the determined uplink scrambling code is unavailable, transmitting a negative acknowledgment to the user equipment.

3. The method of claim 1 wherein the superframes have a set of 72 radio frames and each radio frame is divided into a set of eight time slots.

4. The method of claim 3 wherein the set of signatures numbers sixteen.

5. The method of claim 1 wherein the determined scrambling code is based on a function of the identified signature, transmission time slot and transmission radio frame.

6. The method of claim 1 wherein the random access channel is a common packet channel.

7. A method of assigning uplink scrambling codes for use by a user equipment in transmitting packet data over a random access channel in a code division multiple access communication system, the random access channel being time divided into time slots, the method comprising:

defining a maximum number L of sequential time slots over which a specific data packet can be transmitted;

defining a set of N predetermined scrambling codes for the common packet channel where $N > L$; and

defining an association of the scrambling codes based on in part time slots, such that

when one of the scrambling codes is associated with a specific time slot, the next L time slots are associated with different scrambling codes.

8. The method of claim 7 wherein L is a system design parameter and no packet may exceed L time slots.

9. The method of claim 7 wherein L is a number of time slots typically not exceeded by a data packet.

10. The method of claim 7 wherein L time slots contains a set number of sequential radio frames, each radio frame having a set number of time slots.

11. The method of claim 10 wherein the set number of sequential radio frames is eight and the set number of time slots in each radio frame is eight.

12. The method of claim 7 wherein the defined association repeats every L time slots.

13. The method of claim 7 wherein the random access channel is a common packet channel.

14. A code division multiple access communication system using a random access channel for communication, the random access channel being time divided into super frames having a set of radio frames, each radio frame is time divided into a set of time slots, the system comprising:

a user equipment having:

means for transmitting an access data packet using a selected signature out of a set of signatures and in a time slot of a radio frame; and

means for receiving an acknowledgment message and transmitting a subsequent data packet using a determined uplink scrambling code; and

a base station having:

means for identifying the selected signature, the transmission time slot and the transmission radio frame of the access data packet;

means for determining the uplink scrambling code for the user equipment based on in part the identified signature, transmission time slot and transmission radio frame; and

means for selectively transmitting an acknowledgment message based on in part the identified signature, transmission time slot and transmission radio frame; and

means for selectively transmitting an acknowledgment message based on in part an availability of the determined uplink scrambling code.

15. The system of claim 14 further comprising means for transmitting a negative acknowledgment to the user equipment, if the determined scrambling code is unavailable.

16. The system of claim 14 wherein the superframes have a set of 72 radio frames and each radio frame is divided into a set of eight time slots.

17. The system of claim 16 wherein the set of signatures numbers sixteen.

18. The system of claim 14 wherein the determined scrambling code is based on a function of the identified signature, transmission time slot and transmission radio frame.

19. The system of claim 14 wherein the random access channel is a common packet channel.

20. A controller for assigning scrambling codes for packet data being transferred over a channel in a wireless code division multiple access communication system, the channel being time divided into time slots, the controller comprising:

means for defining a maximum number L of sequential time slots over which a specific data packet can be transmitted;

means for defining a set of N predetermined scrambling codes for the channel where

N > L; and

means for defining an association of the scrambling codes based on in part time slots, such that when one of the scrambling codes is associated with a specific time slot, the next L time slots are associated with different scrambling codes.

21. The controller of claim 20 wherein the controller is used by a base station to assign uplink scrambling codes.

22. The controller of claim 20 wherein the controller is used by a user equipment to determine a scrambling code for uplink communications.

23. The controller of claim 22 wherein the uplink communications are data packets and the channel is a common packet channel.

24. The controller of claim 20 wherein L is a system design parameter and no packet may exceed L time slots.

25. The controller of claim 20 wherein L is a number of time slots typically not exceeded by a data packet.

26. The controller of claim 23 wherein L time slots contains a set of sequential radio frames, each radio frame having a set number of time slots.

27. The controller of claim 26 wherein the set number of sequential radio frames is eight and the set number of time slots in each radio frame is eight.

28. The controller of claim 20 wherein the defined association repeats every L time slots.

ABSTRACT

A user equipment transmits a data packet using a selected signature in a time slot of a radio frame within a superframe of a random access channel. The superframe being time divided into radio frames. A base station identifies the selected signature, transmission time slot and transmission radio frame of the data packet. The base station determines an uplink scrambling code for the user equipment based on in part the identified signature, transmission time slot and transmission radio frame. The base station selectively transmits an acknowledgment message based on in part an availability of the determined uplink scrambling code. The user equipment receives the acknowledgment message and transmits a subsequent data packet using the determined uplink scrambling code.

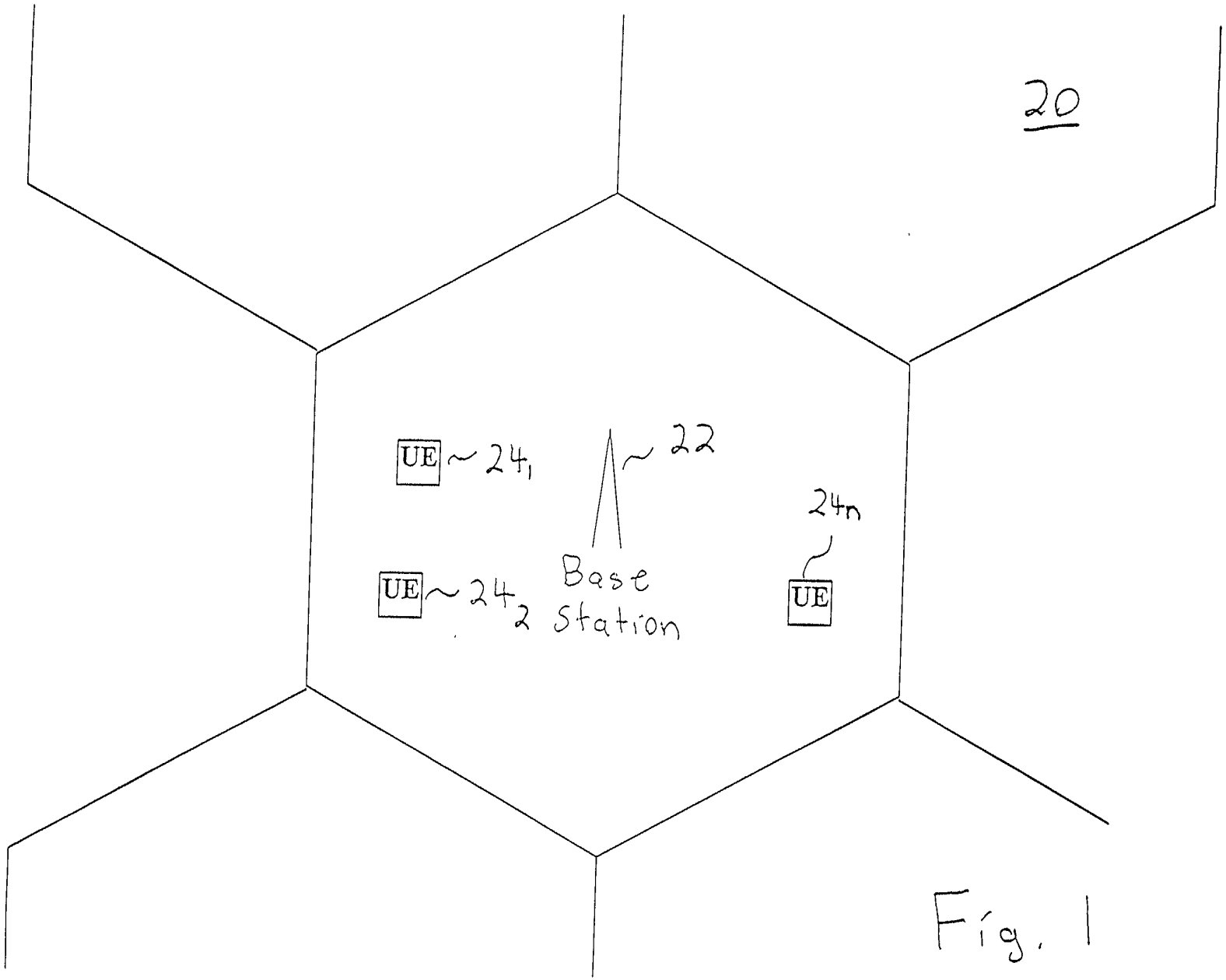

Fig. 1

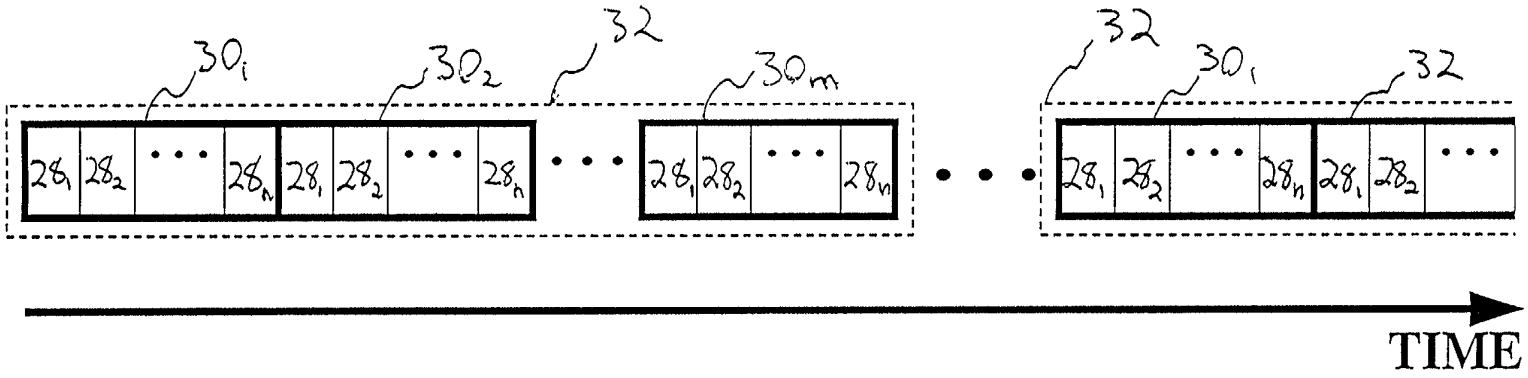

Fig. 2

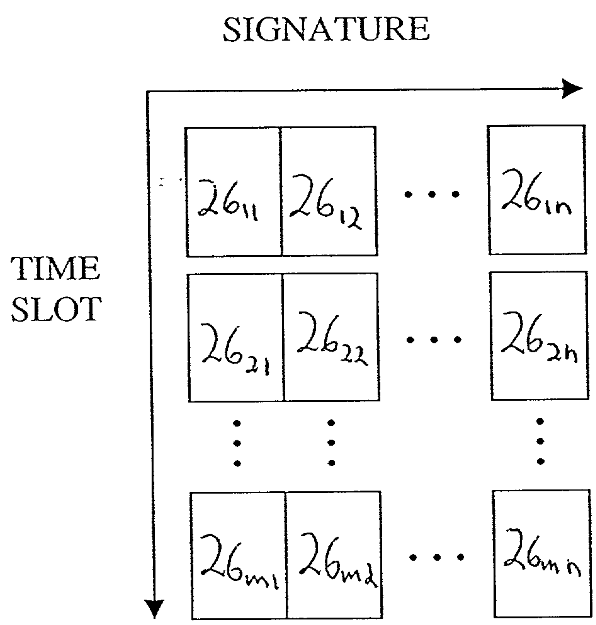
SIGNATURE
TIME SLOT
26_{11}
26_{12}
26_{1n}
26_{21}
26_{22}
26_{2n}
26_{m1}
26_{m2}
26_{mn}

Fig. 3

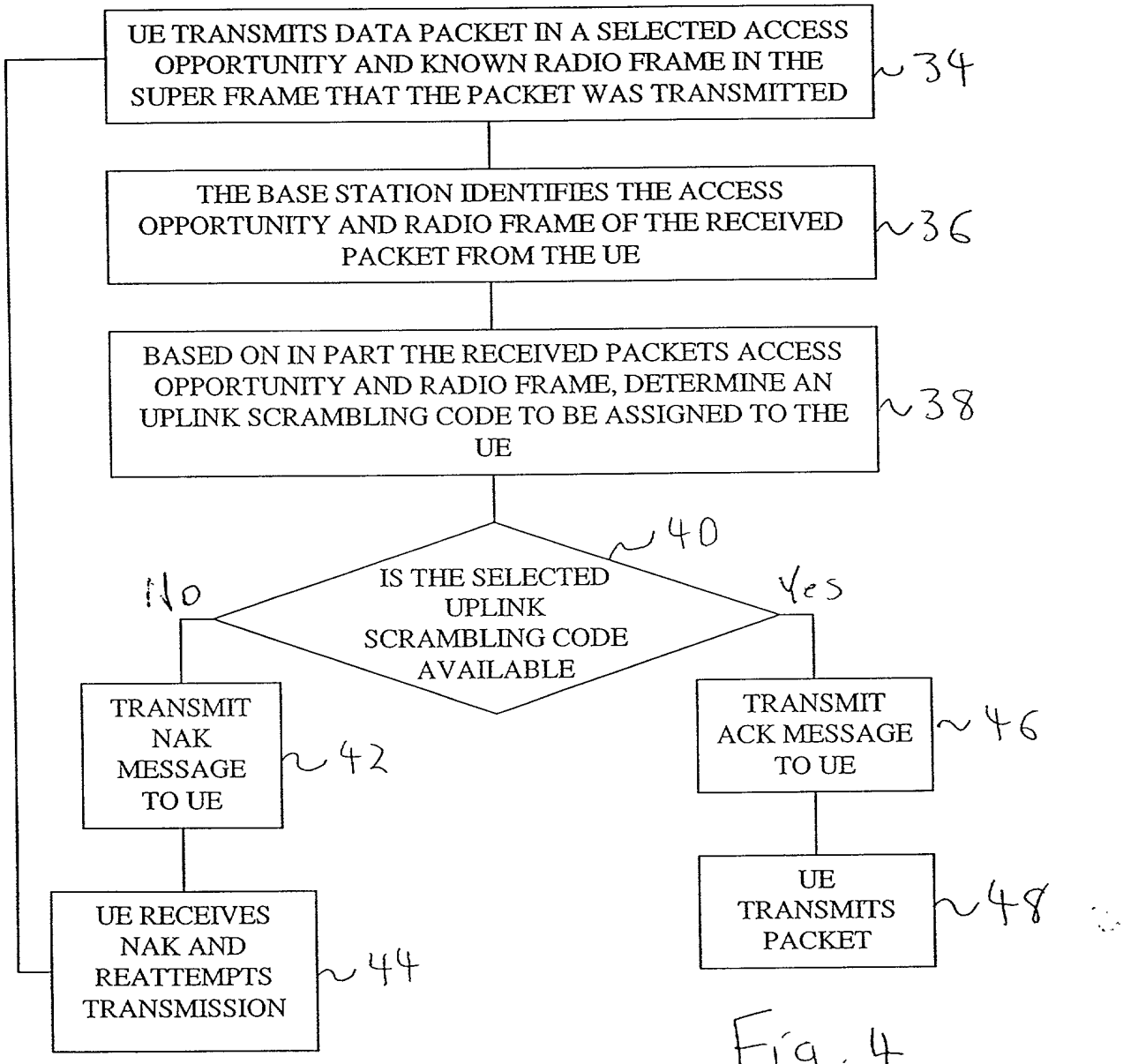
UE TRANSMITS DATA PACKET IN A SELECTED ACCESS OPPORTUNITY AND KNOWN RADIO FRAME IN THE SUPER FRAME THAT THE PACKET WAS TRANSMITTED
34
THE BASE STATION IDENTIFIES THE ACCESS OPPORTUNITY AND RADIO FRAME OF THE RECEIVED PACKET FROM THE UE
36
BASED ON IN PART THE RECEIVED PACKETS ACCESS OPPORTUNITY AND RADIO FRAME, DETERMINE AN UPLINK SCRAMBLING CODE TO BE ASSIGNED TO THE UE
38
IS THE SELECTED UPLINK SCRAMBLING CODE AVAILABLE
40
No
Yes
TRANSMIT NAK MESSAGE TO UE
42
UE RECEIVES NAK AND REATTEMPTS TRANSMISSION
44
TRANSMIT ACK MESSAGE TO UE
46
UE TRANSMITS PACKET
48

Fig. 4

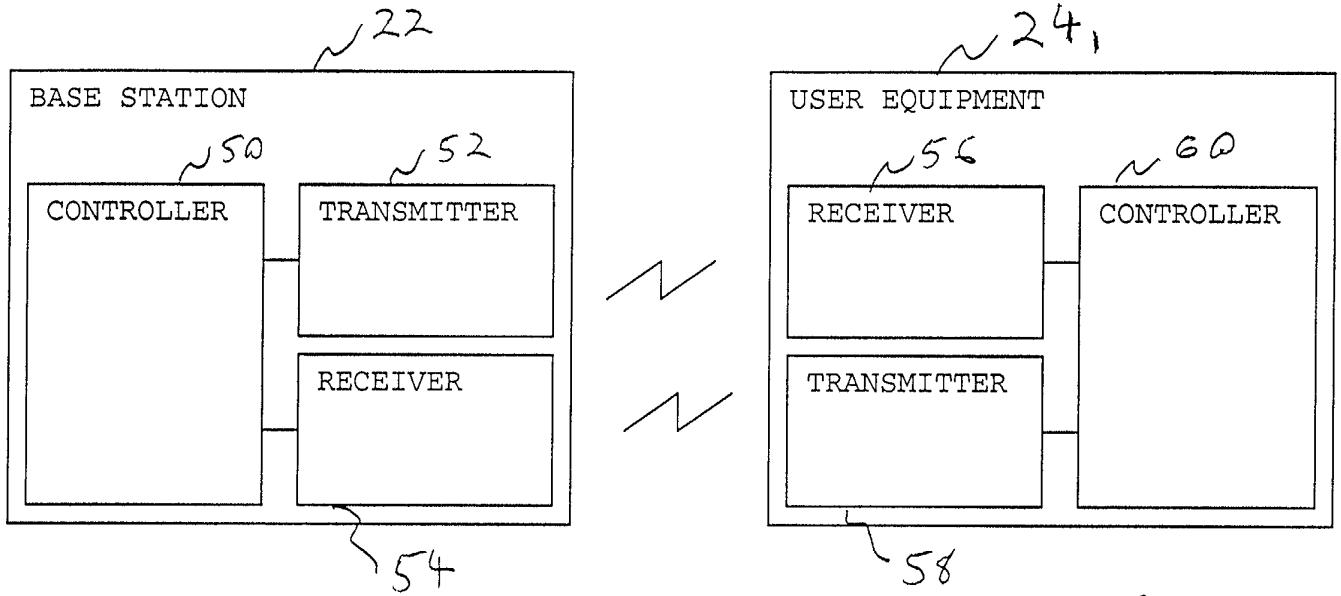
22
BASE STATION
50
CONTROLLER
52
TRANSMITTER
RECEIVER
54
24
USER EQUIPMENT
56
RECEIVER
60
CONTROLLER
TRANSMITTER
58

Fig. 5

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PTO/SB/01 (12-97)
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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	I-2-136.1US
First Named Inventor	Dick et al.
COMPLETE IF KNOWN	
Application Number	Not Yet Known
Filing Date	Not Yet Known
Group Art Unit	Not Yet Known
Examiner Name	Not Yet Known

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled·

UPLINK SCRAMBLING CODE ASSIGNMENT FOR A RANDOM ACCESS CHANNEL

(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

09574650

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(if applicable)*

☐ Additional U.S or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☐ Customer Number [ ] → *Place Customer Number Bar Code Label here*

OR

☒ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number
Alfred Stapler	16,675	Glenn M. Massina	40,081
Anthony S. Volpe	28,377	Jeffrey M. Glabicki	42,584
C. Frederick Koenig III	29,662	Kao H. Lu	43,761
Randolph J. Huis	34,626		
Gerald B. Halt, Jr.	37,633		
Timothy J Lubecki	38,953		

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
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Inventor's Signature						Date	
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☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

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ADDITIONAL INVENTOR(S)
Supplemental Sheet
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Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor						
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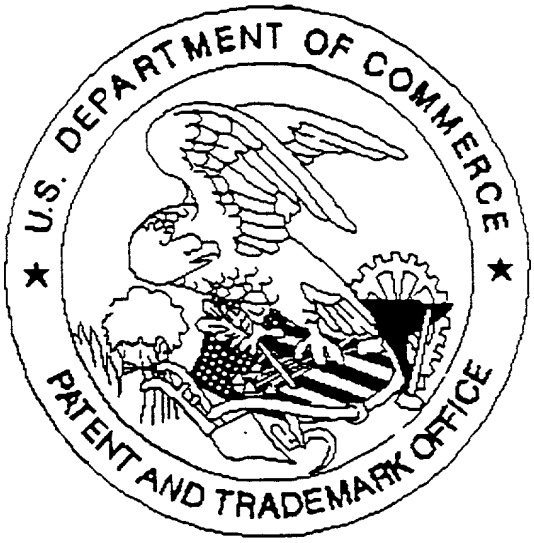

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